



Climate-in-a-Box (CIB) Workshop: Introduction and Overview

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- NASA's Earth Science Technology Office-Advanced Information Systems Technology program
- GSFC's Codes 610, 581, and 583



CIB Staff

■ NASA

- Tsengdar Lee
- Mike Seablom
- Gail McConaughy (retired)
- Tom Clune
- Greg Shirah
- Bill Putman

■ Northrop Grumman

- Carlos Cruz
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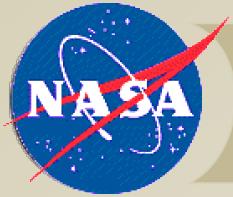
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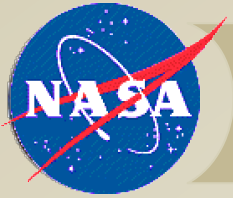
CIB Vision

- CIB seeks to:
 - Develop/improve models through a more efficient “open” model development and validation process
 - Open climate/Earth science model development and validation to a community beyond traditional domain scientists



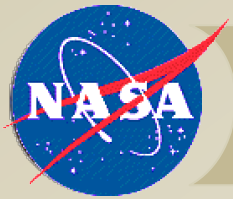
CIB Motivations

- NASA/NOAA climate/earth science models are difficult to use
 - Can be challenging for domain experts
 - Non-typical users (e.g., non-domain scientists, policymakers) may want to run models



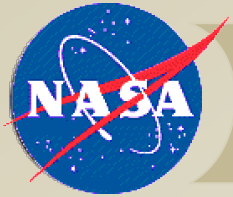
CIB Motivations

- Supercomputing resources are not always readily accessible
 - Wait times in job queues can be extensive
 - Arduous application process for foreign nationals



CIB Goals

- Make NASA/NOAA climate/earth science models more accessible
- Explore desktop supercomputing architectures
- Package models and support software as a “toolkit” for desktop supercomputers
- Explore use of the system for “open” model development/validation



CIB Stages

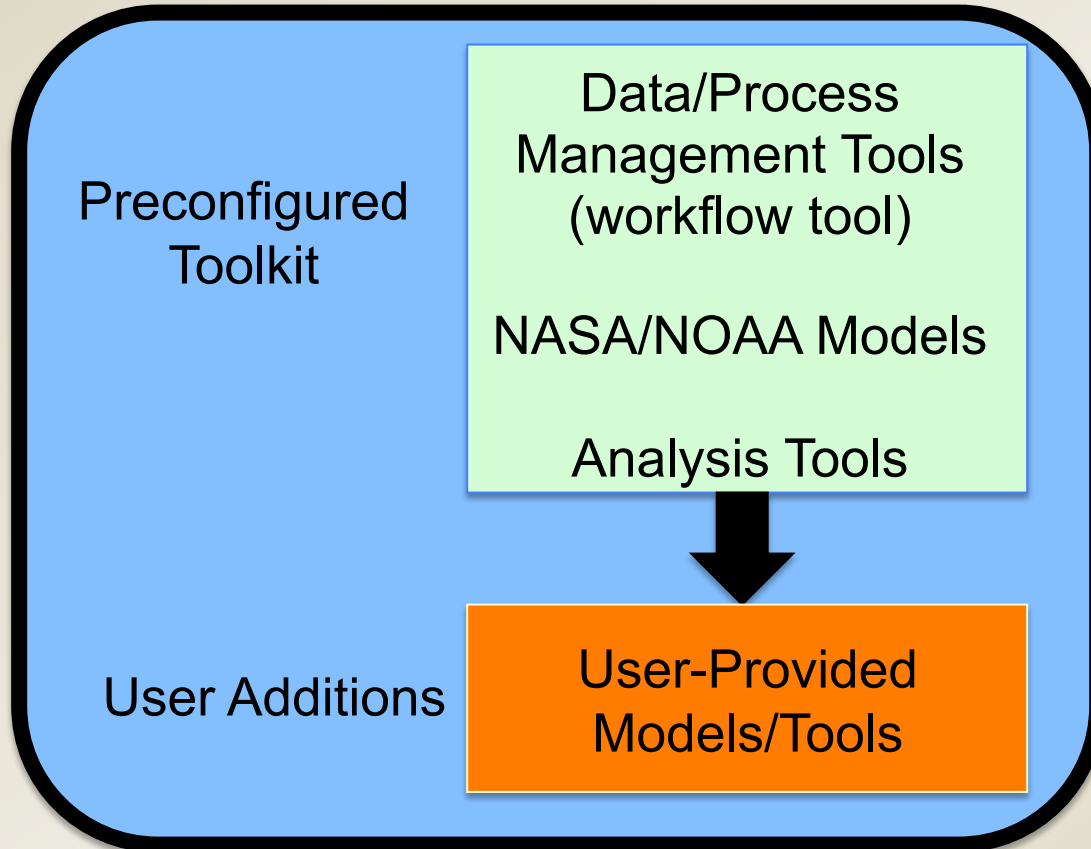
- Port models to architectures other than typical supercomputers
 - Explore desktop architectures
 - Develop model process management tools
- Develop automated software management system
- Explore virtualization



CIB Overview

Desktop System

(testing, development, lower resolution runs)



Traditional Cluster (high resolution runs)



Model Run
Information

Workflow "Switch"
Capability



Modeling Toolkit

- Models (ModelE, GEOS5, WRF)
- Analysis tools (GrADS, NCL)
- Social networking/collaboration capabilities through NASA's Modeling Guru (modelingguru.nasa.gov)
- Process management tools (e.g., workflow tool/NASA Experiment Designer)



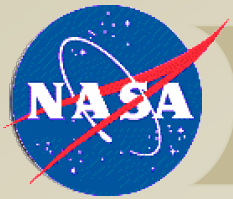
Desktop Architectures

- Cray CX1
 - Project currently has 2 CX1's
 - Cirrus: Development machine
 - Nimbus: Operational machine
- SGI Octane III
 - Evaluated a test machine



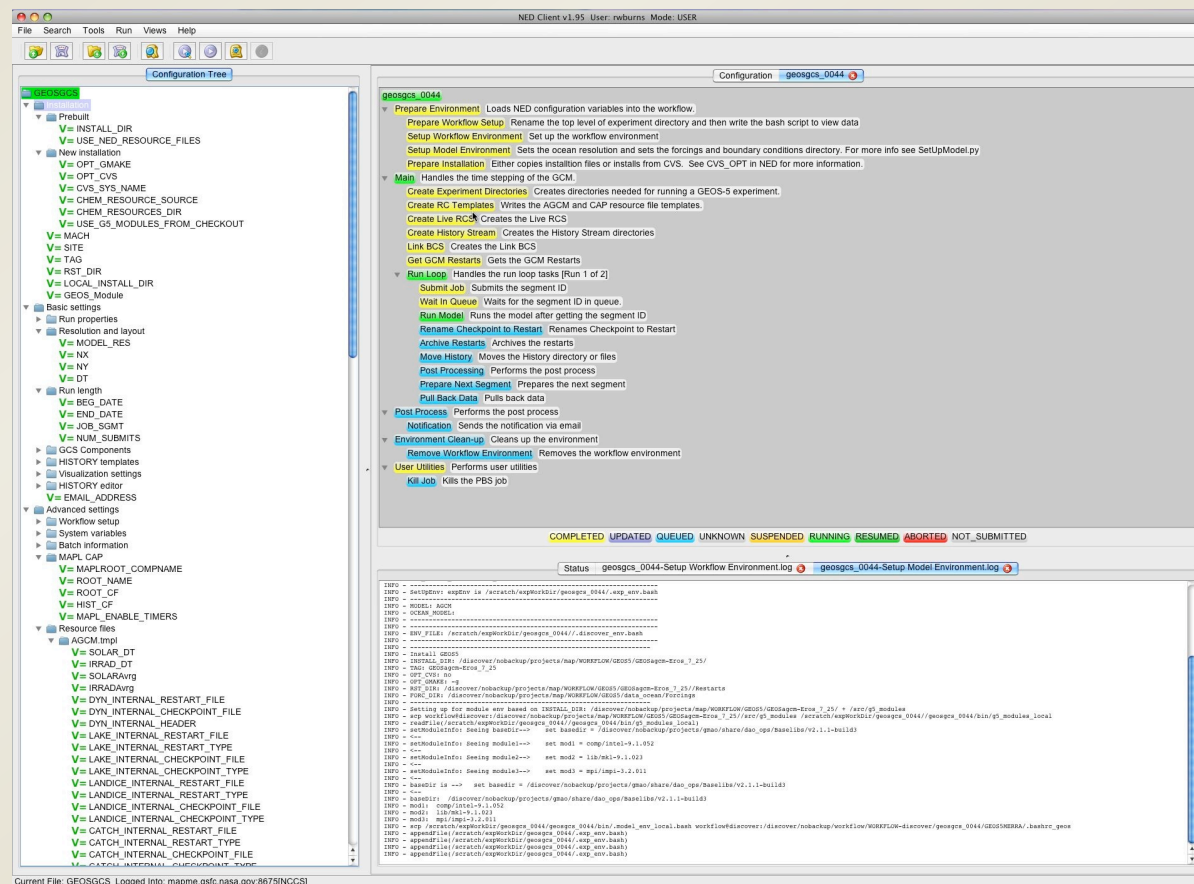
Nimbus Configuration

- 8 “compute nodes”
- Each node has
 - Two Intel 2.6GHz quad-core Nehalem CPUs
 - 24Gb DDR2 RAM
 - One 320Gb 7200rpm hard drive
- Infiniband and GigE networks connecting the compute nodes



Workflow Tool

- Simplifies/Automates model execution management and other processes
- Provides common look and feel between models and between systems
- Allows for experiment sharing and repeatability





Workflow “Switch” Capability

- Enable model execution to be as seamless as possible between CIB and larger cluster or other CIBs
 - Large HPC systems can be used for validation and simulations at a higher resolution
- Data movement through workflow or shared/open resource
- Virtualization: explore a virtual image that can be moved from CIB to larger cluster or other CIBs



Workshop Expectations

- Will not be providing
 - Desktop architecture sys admin training
 - Details on model science or model codes
- Software you will see and use has been tuned to our environment



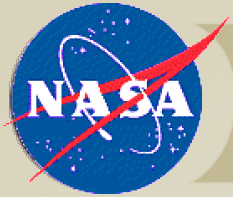
Workshop Goals

- Provide overview of Climate in a Box (CIB)
 - Models
 - Workflow Tool
 - Distributed Modeling System
- Provide hands-on training to CIB users
 - Running CIB models
 - Developing Workflows for CIB models
- Receive feedback from CIB users on all aspects of CIB



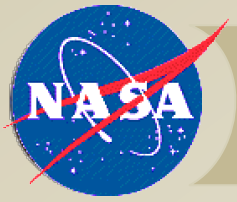
Workshop Agenda Day 1

- Introduction and Models
 - Welcome (8:30am-9am)
 - GEOS-5 (9am-12pm)
 - Lunch Offsite
 - WRF (1-3pm)
 - ModelE (3-4pm)



Workshop Agenda Day 2

- **Workflow Tool and Distributed Modeling System**
 - Introduction to the NASA Workflow Tool (8:30-9am)
 - NASA Experiment Designer (NED; 9-10am)
 - Running the GEOS-5 Workflow (10-10:30am)
 - Creating a Workflow Part I (10:30-11:30am)
 - Lunch Offsite
 - Creating a Workflow Part II (12:30-2:30pm)
 - Distributed Modeling System (2:30-3:30pm)
 - Wrap-up (3:30-4:00)



Welcome!

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